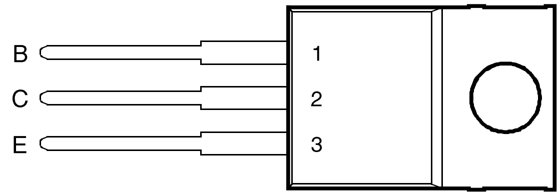
TRANSYS ELECTRONICS LIMITED

TIP105, TIP106, TIP107
PNP SILICON POWER DARLINGTONS

- **Designed for Complementary Use with TIP100, TIP101 and TIP102**
- **80 W at 25˚C Case Temperature**
- **8 A Continuous Collector Current**
- **Maximum $V_{CE(sat)}$ of 2.5 V at I_C = 8 A**

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

absolute maximum ratings **at 25˚C case temperature (unless otherwise noted)**

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	TIP105 TIP106 TIP107	V_{CBO}	-60 -80 -100	V
Collector-emitter voltage (I_B = 0)	TIP105 TIP106 TIP107	V_{CEO}	-60 -80 -100	V
Emitter-base voltage		V_{EBO}	-5	V
Continuous collector current		I_C	-8	A
Peak collector current (see Note 1)		I_{CM}	-15	A
Continuous base current		I_B	-1	A
Continuous device dissipation at (or below) 25˚C case temperature (see Note 2)		P_{tot}	80	W
Continuous device dissipation at (or below) 25˚C free air temperature (see Note 3)		P_{tot}	2	W
Unclamped inductive load energy (see Note 4)		$½LI_C^2$	10	mJ
Operating junction temperature range		T_j	-65 to +150	˚C
Storage temperature range		T_{stg}	-65 to +150	˚C
Lead temperature 3.2 mm from case for 10 seconds		T_L	260	˚C

NOTES:
1. This value applies for $t_p \leq$ 0.3 ms, duty cycle $\leq$ 10%.
2. Derate linearly to 150˚C case temperature at the rate of 0.64 W/˚C.
3. Derate linearly to 150˚C free air temperature at the rate of 16 mW/˚C.
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = 20 mH, $I_{B(on)}$ = -5 mA, R_{BE} = 100 Ω, $V_{BE(off)}$ = 0, R_S = 0.1 Ω, V_{CC} = -20 V.

electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C = -30 mA (see Note 5)	I_B = 0	TIP105 TIP106 TIP107	-60 -80 -100			V
I_{CEO}	Collector-emitter cut-off current	V_{CE} = -30 V V_{CE} = -40 V V_{CE} = -50 V	I_B = 0 I_B = 0 I_B = 0	TIP105 TIP106 TIP107			-50 -50 -50	μA
I_{CBO}	Collector cut-off current	V_{CB} = -60 V V_{CB} = -80 V V_{CB} = -100 V	I_E = 0 I_E = 0 I_E = 0	TIP105 TIP106 TIP107			-50 -50 -50	μA
I_{EBO}	Emitter cut-off current	V_{EB} = -5 V	I_C = 0				-8	mA
h_{FE}	Forward current transfer ratio	V_{CE} = -4 V V_{CE} = -4 V	I_C = -3 A I_C = -8 A	(see Notes 5 and 6)	1000 200		20000	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = -6 mA I_B = -80 mA	I_C = -3 A I_C = -8 A	(see Notes 5 and 6)			-2 -2.5	V
V_{BE}	Base-emitter voltage	V_{CE} = -4 V	I_C = -8 A	(see Notes 5 and 6)			-2.8	V
V_{EC}	Parallel diode forward voltage	I_E = -8 A	I_B = 0	(see Notes 5 and 6)			-3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, t_p = 300 μs, duty cycle ≤ 2%.
6. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1.56	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W
$C_{\theta C}$	Thermal capacitance of case		0.9		J/°C

resistive-load-switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_d	Delay time	I_C = -8 A $V_{BE(off)}$ = 5 V	$I_{B(on)}$ = -80 mA R_L = 5 Ω	$I_{B(off)}$ = 80 mA t_p = 20 μs, dc ≤ 2%		35		ns
t_r	Rise time					300		ns
t_s	Storage time					900		ns
t_f	Fall time					1.3		μs

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT

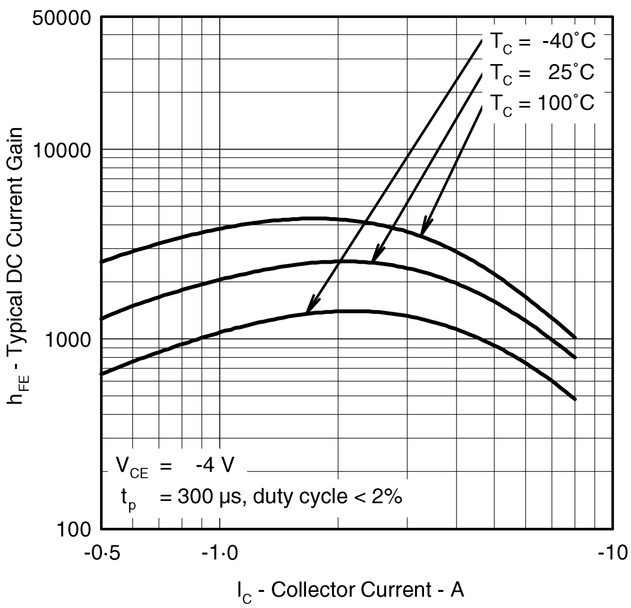


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT

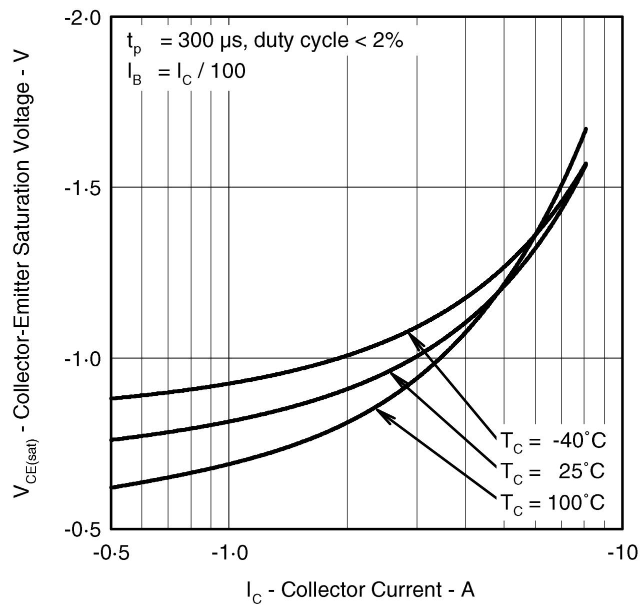


Figure 2.

BASE-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT

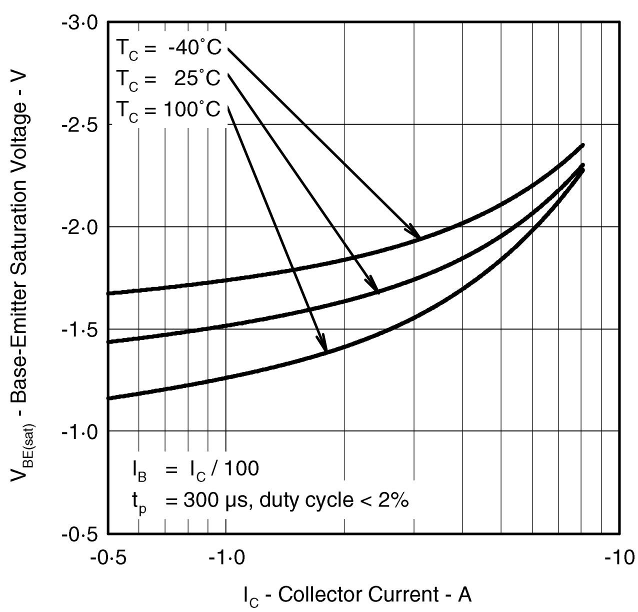


Figure 3.

MAXIMUM SAFE OPERATING REGIONS

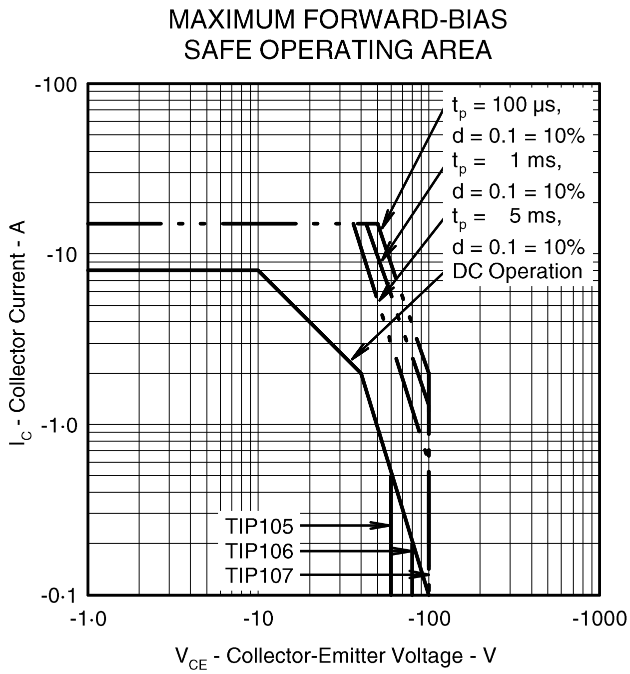


Figure 4.

THERMAL INFORMATION

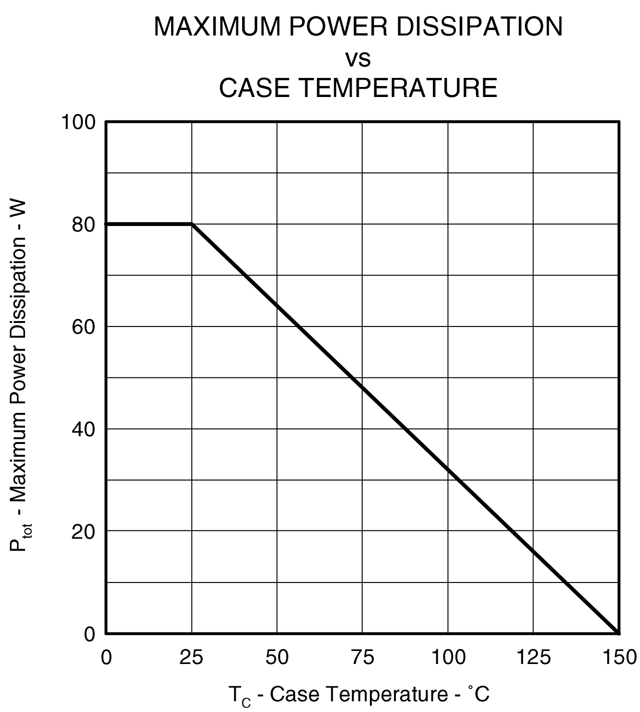


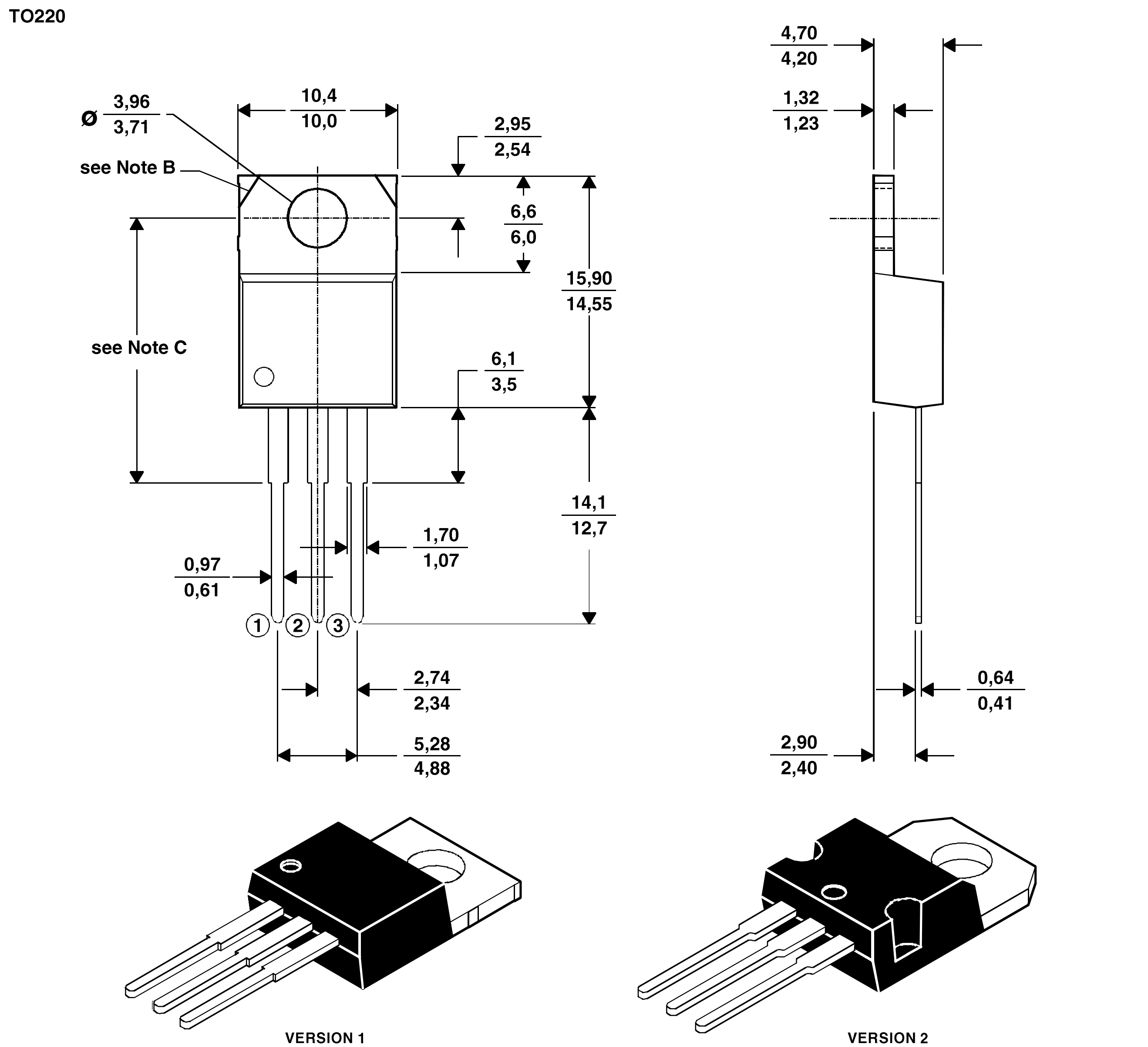
Figure 5.

MECHANICAL DATA

TO-220

3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



ALL LINEAR DIMENSIONS IN MILLIMETERS

NOTES:
- A. The centre pin is in electrical contact with the mounting tab.
- B. Mounting tab corner profile according to package version.
- C. Typical fixing hole centre stand off height according to package version. Version 1, 18.0 mm. Version 2, 17.6 mm.